Lead Risk Assessment
Convent Property
Reading, PA

Prepared for
Exide Technologies
3000 Montrose Ave
Reading, PA 19605

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GRADIENT

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1 Introduction

Gradient performed an evaluation of human exposures to lead in soil at the convent property in Reading, PA. In addition to a convent, the subject property is used as a retirement home. The 32.9 acre property includes a main residential building, a smaller residence/office building, an unused seminary building, landscaped areas with lawns and mature trees, paved walkways and parking lot, wooded areas in the northern and southern portions, and an undeveloped field in the eastern portion (Figure 1). The property is bordered on the east and north by undeveloped land owned by a cemetery.

2 Exposure Areas

The property was divided into five exposure areas, according to current land use and estimated frequency of contact by potential receptors (Figure 2).

- Inner Loop. The Inner Loop is an area in the center of the property where residents are likely to spend most of their time. It includes the landscaped areas with paved walkways that are nearest to the main residential building.
- North Property. The North Property is a wooded area in the northern portion of the convent property. It is less open and accessible and is thus assumed to be contacted less frequently.
- Field. The Field is an open field on the eastern portion of the property, that slopes down to the east.
- Peninsula Flat. The southern extension of the property is a peninsula-shaped section of land. The Peninsula Flat exposure area occupies the western portion of the peninsula, which is relatively flat, and includes open landscaped areas, and a residence/office building.
- Peninsula Hillside. The eastern portion of the peninsula includes a steep hill that slopes down to the east.

3 Receptors and Exposure Pathways

Based on the current land use, four receptors were evaluated for the convent property:

- Convent resident
- Convent day worker
- Groundskeeper
- Landscaper

The convent property is used for both a convent and a retirement community, thus the convent residents are all adults. A convent day worker is an adult who works at the convent to assist the residents during the day. A groundskeeper is assumed to be an adult who works at the convent periodically to cut the grass and maintain the landscaping. These three receptors are assumed to be exposed to surface soil (depth 0-3 inches). The landscaper is assumed to be exposed to a combination of surface and subsurface soil while planting flowers or shrubs. The only pathway of potential exposure for all receptors is incidental soil ingestion. The potential for a resident's exposure to soil while gardening and a child visitor is discussed in Section 7.

The exposure frequency (EF) varies by receptor and exposure area (Table 1). The convent resident is assumed to have an EF of 365 days/year in the Inner Loop, North Property, and Peninsula Flat exposure areas, and an EF of one day/week (52 days/year) in the Field. The convent day worker is assumed to have an EF of 219 days/year in the Inner Loop, North Property, and Peninsula Flat exposure areas, and 10 days/year in the Field. The value of 219 days/year is recommended by US EPA (2003) and is based on the average time spent at work by both full-time and part-time workers. The groundskeeper is assumed to have an EF of one day every two weeks (26 days/year) in all exposure areas. The landscaper is assumed to have an EF of 10 days/year in the Inner Loop, North Property, Field, and Peninsula Flat exposure areas. (Subsurface soil samples were not collected from the Peninsula Hillside exposure area, thus the landscaper was not evaluated in this area.)

4 Exposure Point Concentrations

Soil data were collected from a total of 68 grids on the convent property in 2001. Each grid was approximately one-half acre in size. The sampling grids are lettered, and are shown on Figure 2. Surface soil was collected from a depth of 0-3 inches. Three sets of four grab samples were composited to create three composite surface soil samples in each grid. The average surface soil lead concentration for each grid is the arithmetic average of the three composite surface samples. Subsurface samples (depth 3-10 inches) were also collected at the rate of one per grid. Surface soil data were used for the resident, day worker, and groundskeeper, because surface soil is the depth most likely to be contacted by these receptors. . The landscaper was evaluated for contact with surface and subsurface soil combined (0-10 inches). The average soil concentration (for 0-10 inches) in each grid was calculated as a weighted average of the shallow and deep samples:

$$\text{Average Pb Conc (0-10")} = [0.3 \times \text{(0-3" Avg Pb conc)}] + [0.7 \times \text{(3-10" Pb conc)}]$$

Summary statistics for each exposure area (number of grids, range and mean of the grid-average soil lead concentrations) are presented in Table 2. The individual grid data are presented in Appendix A (Table A.1 for surface soil (0-3 inches), and Table A.2 for subsurface soil (0-10 inches). The exposure point concentration (EPC) for each exposure area is the arithmetic mean soil lead concentration from all the grids within the exposure area.

The Inner Loop exposure area includes a number of buildings and paved walkways that prevent access to surface soil. An evaluation was performed to determine if excluding the impervious surfaces would have a significant impact on the calculated EPC, and it was concluded it would not.[1]

5 Risk Evaluation

The lead risk evaluation determined the incremental increase in blood lead level due to soil exposure on the convent property. A recent summary of toxicity information for lead is presented in US EPA's 2013 Integrated Science Assessment for Lead (US EPA, 2013), and is not summarized here.

US EPA's Adult Blood Lead Model (ALM) (US EPA, 2003) was used to evaluate lead risk for adults. The ALM is framed in terms of incremental effects attributable to particular environmental sources of lead, over and above an assumed steady state baseline blood lead level. A specified set of typical background exposure levels is presumed. Increments of blood lead over this baseline are estimated using

[1] The Inner Loop EPC that accounts for impervious areas (2,087 mg/kg) differs little from the EPC that does not account for impervious areas (2,092 mg/kg). See AGC's Remediation Plan for additional details.

environmental concentrations, ingestion rates, and estimates of fraction of lead intake that is absorbed. The total incremental uptake is related to an increase over the baseline blood lead level ($PbB_{baseline}$) through an empirically determined proportionality constant, the Biokinetic Slope Factor (BKSF).

US EPA defaults were used for the baseline and exposure parameters. Baseline blood leads were obtained from US EPA (2016a) and are based on National Health and Nutrition Examination Surveys (NHANES) data from 2007-2012. For adults, the geometric mean (GM) and geometric standard deviation (GSD) BLLs for women of childbearing age (ages 18-45) were used, where the GM was 0.7 µg/dL, and the GSD was 1.7.

The total soil/dust ingestion rates were 0.05 g/day for the convent resident and day worker, and 0.10 g/day for the groundskeeper and landscaper. The soil ingestion rate assumed for the resident is the default soil/dust ingestion rate for the model. It was assumed that the groundskeeper and landscaper could have more intensive soil contact. While the default of 0.05 g/day represents exposure by occupational receptors during the work day, the mean soil ingestion rate for adult residents is also assumed to be 0.05 g/day (US EPA, 2011). For all receptors, it was conservatively assumed that 100% of incidental soil ingestion came from soil. The absorption fraction for lead from soil was 12%. The Biokinetic Slope Factor was 0.4 µg/dL per µg/day. The averaging time for all receptors was 365 days.

Lead risks are summarized in Table 3; detailed risk calculations are presented in Table 4. EPA has selected a target BLL for an adult female in order to protect a developing fetus such that the fetus has no more than a 5% probability of a BLL exceeding 10 µg/dL; thus lead risk is given as the probability of a fetal blood lead greater than 10 µg/dL. Lead risks for the convent resident are 11% in the Inner Loop and North Property areas, and less than EPA's target risk of 5% in the Field and Peninsula Flat areas. Lead risks for the day worker, groundskeeper, and landscaper are less than 5% in all areas.

A hotspot evaluation was conducted for a groundskeeper exposure to the maximum average surface soil grid concentration (20,472 mg/kg), which occurs in the Field exposure area in Grid U. A groundskeeper could be exposed to this grid for up to 14 days/year (or 1 day/month) and still have acceptable risk (Table 5). With a total EF of 26 days/year, it is unlikely that this receptor would spend slightly over half his exposure days just in one grid. Therefore, it is concluded that the presence of elevated lead in any one particular grid is unlikely to present an unacceptable risk to the groundskeeper.

6 Uncertainty

The EF used for the landscaper and groundskeeper was 10 and 26 days/year, respectively. However, recent EPA guidance (US EPA, 2016b) states that the exposure frequency should be at least one day per week to assess risk with the ALM. EPA further notes that if the exposure scenario does not meet this threshold, either the scenario can be modified, or an alternative blood lead model can be used. If the risk for the landscaper and groundskeeper were based on an EF of 52 days/year, the Convent resident would remain the risk driver in three of the five exposure areas (Inner Loop, North Property, Peninsula Flat), and the Convent resident would remain the basis of the preliminary remediation goal (PRG, discussed below). However, with an EF of 52 days/year, the groundskeeper would have unacceptable risks in both the Field and Peninsula Hillside exposure areas, and would become the risk driver in these exposure areas. Nevertheless, it is highly unlikely that the groundskeeper would spend 52 days/year in either the Field or Peninsula Hillside, and thus this assumption would result in an over-estimate of risk. The landscaper is even less likely to spend 52 days/year in these exposure areas.

It is noted that for all receptors, it was assumed that 100% of incidental soil/dust ingestion came from soil. This is a conservative assumption, because some portion of a resident's total soil/dust ingestion

comes from dust, and dust may have a lower concentration than outdoor soil, because only a portion of the dust is composed of outdoor soil. Note that the Child Lead Risk Assessment, Reading, Pennsylvania (Gradient, 2003) evaluated risks with interior house dust lead levels that were lower than soil lead levels based on sampling data. The factors that influence the amount of soil that contributes to house dust (*e.g.* climate, vegetative cover) would be expected to be the same at the Convent property as in the adjacent residential areas evaluated in the Child Lead Risk Assessment. Therefore it is likely that the risks presented in this report for Convent residents and Convent day workers are over-estimated as a result of this assumption.

7 Preliminary Remediation Goal

The soil lead preliminary remediation goal (PRG) for a convent resident was calculated as 1640 mg/kg (Table 6). It is calculated so that a developing fetus has no more than a 5% probability of having a BLL exceeding 10 μg/dL. The PRG is meant to be met on average over an exposure area.

Children may visit the Convent on occasion. Assuming the use of a PRG of 1640 mg/kg as the average acceptable lead concentration over the exposure area, and remediation of areas which cause the average to exceed 1640 mg/kg, a young child could visit for up to 89 days/year and still have acceptable risk, assuming a residential cleanup goal (CUG) of 400 mg/kg, or up to 145 days/year assuming a residential CUG of 650 mg/kg. This was calculated from the following equation, which assumes that the child is not exposed to lead in soil at home during the days he does not visit the Convent:

$$\text{Allowable Child Visits (days/year)} = (\text{Residential CUG})/(\text{PRG}) \times 365 \text{ days/year}$$

Since it is likely that children will visit the convent less than 89 days/year, it was concluded that the PRG for the convent resident will be adequately protective of occasional child visitors.

Non-residents may visit the Convent for periodic cookouts, and a car show held one day per year. The cookout area is in Grid R, and the area used for the car show covers Grids KK and Q (Figure 2). Infrequent exposure to surface soil in these grids is unlikely to result in unacceptable risk for non-residents. Nevertheless, these three grids will be addressed in a remediation work plan that is under development by Exide.

Convent residents currently do not engage in gardening and have not done so in several years. However, should Convent residents engage in gardening in the future, they may have increased exposure to soil, may contact subsurface soil, and could be exposed to lead from consumption of homegrown produce. In order to address the potential exposures from gardening, Exide will discuss with the Convent setting aside designated areas for gardening, and these areas will be addressed in the remediation work plan. [Exide is aware that the Convent recently installed raised beds in a fenced area for use by local students, however, these are filled with clean topsoil. The garden is immediately northwest of the existing pavilion in Grid R, which is already targeted for remediation.]

8 Conclusions

Risks from the potential exposure to lead in soil were evaluated for four adult receptors at the Convent property: a convent resident, a convent day worker, a groundskeeper, and a landscaper. Lead risks were evaluated by modeling the increment to blood lead level and adding that increment to a background blood lead level representative of typical levels of exposure to lead in the general U.S. population. Predicted total blood lead levels were evaluated by estimating the percent probability that they would exceed 10 μg/dL.

In the Inner Loop and North Property exposure areas, the lead risk for the convent resident who has daily exposure to soil is 11%, which exceeds EPA's target risk of 5%. These results indicate that some soil remediation will be required in both of these exposure areas. Lead risks for the convent resident are less than EPA's target of 5% in the Field and Peninsula Flat areas. Lead risks for the day worker, groundskeeper, and landscaper are less than EPA's target of 5% in all exposure areas.

References

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Tables

Table 1 Exposure Frequency (days/year)

Exposure Area	Convent Resident	Convent Day Worker	Groundskeeper	Landscaper
Inner Loop	365	219	26	10
North Property	365	219	26	10
Field	52	10	26	10
Peninsula Flat	365	219	26	10
Peninsula Hillside	NA	NA	26	NA

Note:
NA - Not Applicable.

Table 2 Convent Soil Lead Data Summary

Exposure Area	Depth	Number of Grids	Min Grid Avg (mg/kg)	Max Grid Avg (mg/kg)	Avg Grid Avg (mg/kg)
Inner Loop	0-3"	26	106	4084	2092
North Property	0-3"	16	651	6149	2140
Field	0-3"	12	3476	20,472	8672
Peninsula Flat	0-3"	8	548	1729	831
Peninsula Hillside	0-3"	6	3229	13,336	7862
Inner Loop	0-10"	26	89	2668	1490
North Property	0-10"	16	588	2830	1553
Field	0-10"	12	1923	11,631	5462
Peninsula Flat	0-10"	8	574	1447	813

Table 3 Convent Lead Risk Summary

Exposure Area	Receptor	Lead EPC (mg/kg)	Lead Risk*
Inner Loop	Convent Resident	2092	**11%**
Inner Loop	Convent Day Worker	2092	2%
Inner Loop	Groundskeeper	2092	0.005%
Inner Loop	Landscaper	1490	0.0001%
North Property	Convent Resident	2140	**11%**
North Property	Convent Day Worker	2140	2%
North Property	Groundskeeper	2140	0.006%
North Property	Landscaper	1553	0.0001%
Field	Convent Resident	8672	2%
Field	Convent Day Worker	8672	0.002%
Field	Groundskeeper	8672	2%
Field	Landscaper	5462	0.005%
Peninsula Flat	Convent Resident	831	0.4%
Peninsula Flat	Convent Day Worker	831	0.04%
Peninsula Flat	Groundskeeper	831	0.0002%
Peninsula Flat	Landscaper	813	0.00004%
Peninsula Hillside	Groundskeeper	7862	1%

Notes:

* Lead Risk is given as the probability that a fetal blood lead is greater than 10 µg/dL.

Risks in bold exceed US EPA's target risk criterion of 5%.

Soil depth evaluated was 0-3 inches.

EPC - Exposure Point Concentration.

Table 4 Convent Lead Risks

Variable	Description of Variable	Exposure Area: Units	Inner Loop Convent Resident	Inner Loop Convent Day Worker	Inner Loop Grounds-keeper	Inner Loop Landscaper	North Property Convent Resident	North Property Convent Day Worker	North Property Grounds-keeper	North Property Landscaper	Field Convent Resident	Field Convent Day Worker	Field Grounds-keeper	Field Landscaper
PbS	Soil lead concentration	µg/g or ppm	**2092**	**2092**	**2092**	**1490**	**2140**	**2140**	**2140**	**1553**	**8672**	**8672**	**8672**	**5462**
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
PbB_0	Baseline PbB	µg/dL	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050	0.100	0.100	0.050	0.050	0.100	0.100	0.050	0.050	0.100	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	--	--	--	--	--	--	--	--	--	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	--	--	--	--	--	--	--	--	--	--
K_{SD}	Mass fraction of soil in dust	--	--	--	--	--	--	--	--	--	--	--	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	365	219	26	10	365	219	26	10	52	10	26	10
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365	365	365	365	365	365	365	365	365	365	365	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	5.7	3.7	1.4	0.9	5.8	3.8	1.4	0.9	3.7	1.3	3.7	1.4
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	12	8.0	3.0	1.9	13	8.1	3.1	1.9	7.9	2.7	7.9	3.1
PbB_t	Target PbB level of concern (*e.g .*, 10 µg/dL)	µg/dL	10	10	10	10	10	10	10	10	10	10	10	10
$P(PbB_{fetal} > PbB_t)$	Probability that fetal PbB > PbB_t, assuming lognormal distribution	**%**	**11%**	2%	0.005%	0.0001%	**11%**	2%	0.006%	0.0001%	2%	0.002%	2%	0.005%

Notes:
Baseline blood lead levels obtained from US EPA, 2016a.
Risks in bold exceed US EPA's target risk criterion of 5%.

Table 4 Convent Lead Risks

Variable	Description of Variable	Exposure Area: Units	Peninsula Flat Convent Resident	Peninsula Flat Convent Day Worker	Peninsula Flat Grounds-keeper	Peninsula Flat Landscaper	Peninsula Hillside Grounds-keeper
PbS	Soil lead concentration	µg/g or ppm	**831**	**831**	**831**	**813**	**7862**
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	0.4	0.4	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.7	1.7	1.7	1.7	1.7
PbB_0	Baseline PbB	µg/dL	0.7	0.7	0.7	0.7	0.7
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050	0.100	0.100	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	--	--	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	--	--	--
K_{SD}	Mass fraction of soil in dust	--	--	--	--	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	365	219	26	10	26
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365	365	365	365	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	2.7	1.9	1.0	0.8	3.4
$PbB_{fetal,\ 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	5.8	4.1	2.1	1.7	7.3
PbB_t	Target PbB level of concern (*e.g.*, 10 µg/dL)	µg/dL	10	10	10	10	10
$P(PbB_{fetal} > PbB_t)$	Probability that fetal PbB > PbB_t, assuming lognormal distribution	**%**	0.4%	0.04%	0.0002%	0.00004%	1%

Notes:
Baseline blood lead levels obtained from US EPA, 2016a.
Risks in bold exceed US EPA's target risk criterion of 5%.

Table 5 Hotspot Evaluation for Maximum Grid Concentration

Variable	Description of Variable	Exposure Area: Units	Field, Grid U Groundskeeper
PbS	Soil lead concentration	µg/g or ppm	**20,472**
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.7
PbB_0	Baseline PbB	µg/dL	0.7
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	**14**
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	**4.5**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	9.6
PbB_t	Target PbB level of concern (*e.g.,* 10 µg/dL)	µg/dL	10
$P(PbB_{fetal} > PbB_t)$	Probability that fetal PbB > PbB_t, assuming lognormal distribution	**%**	**4%**

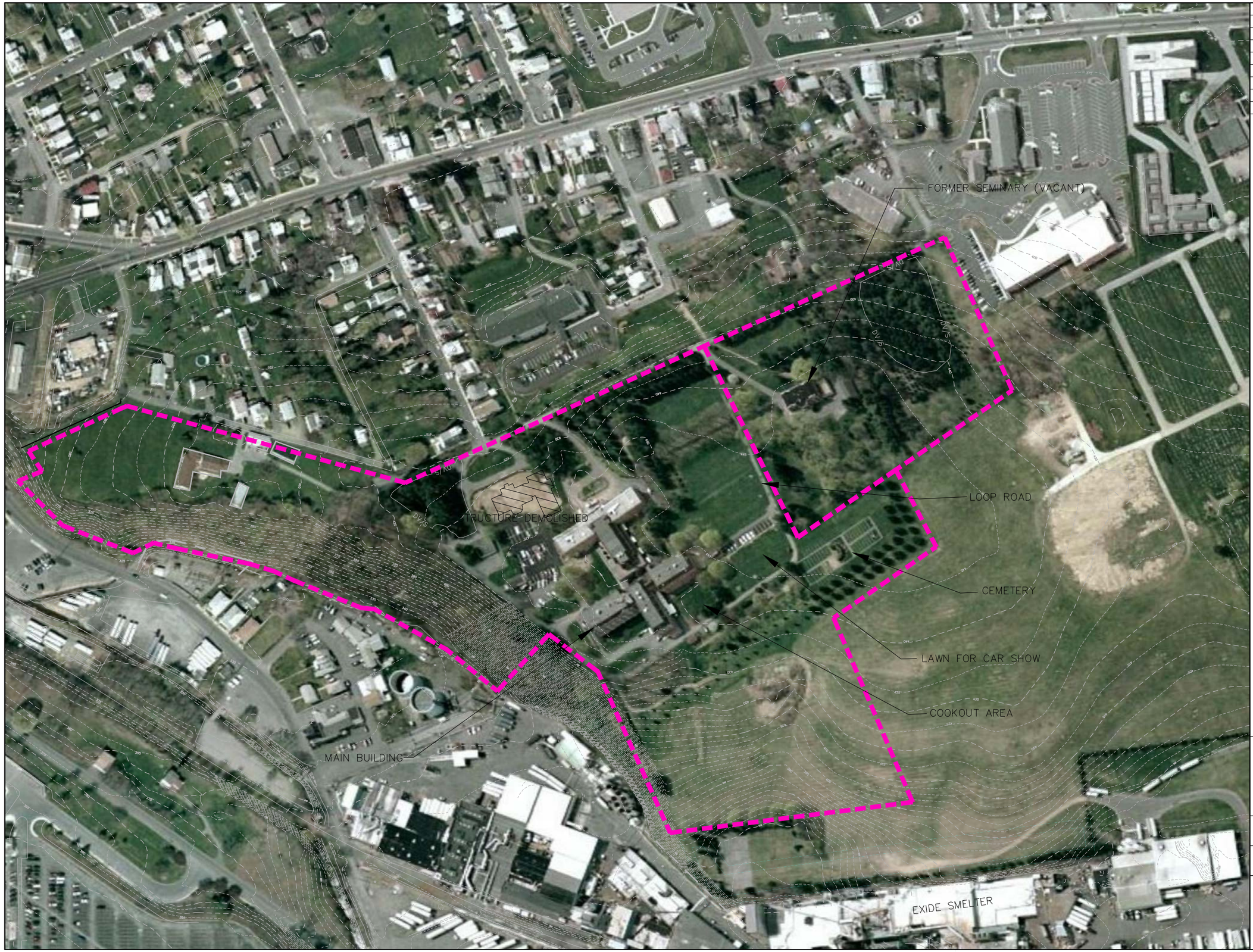
Table 6 Calculation of Preliminary Remediation Goal (PRG)

Variable	Description of Variable	Units	Convent Resident
PbS	Soil lead concentration	µg/g or ppm	**1640**
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	µg/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.7
PbB_0	Baseline PbB	µg/dL	0.7
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	365
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	4.6
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	10
PbB_t	Target PbB level of concern (*e.g* ., 10 µg/dL)	µg/dL	10
$P(PbB_{fetal} > PbB_t)$	Probability that fetal PbB > PbB_t, assuming lognormal distribution	%	**5%**

Note:

Baseline blood lead levels obtained from US EPA, 2016a.

Figures



DATE:	REVISION:

LEGEND

PARCEL BOUNDARY

NORTH

100 0 100 200

SCALE IN FEET

ADVANCED GeoServices

Engineering for the Environment. Planning for People.™

1055 ANDREW DRIVE, SUITE A
WEST CHESTER, PENNSYLVANIA 19380

EXIDE TECHNOLOGIES
OFF-SITE SOIL INVESTIGATION

CONVENT PROPERTY
AERIAL PHOTO

Scale:	1" = 100'
Originated By:	P.G.S.
Drawn By:	M.J.P.
Checked By:	P.G.S.
Project Mgr.:	P.G.S.
Project No.:	2008-2232
Figure:	1
Issued:	

DATE:	REVISION:

LEGEND

PARCEL BOUNDARY

NS NOT SAMPLED

USE AREAS

FIELD

NORTH PROPERTY AND CEMETERY

INNER LOOP

CONVENT PENINSULA (FLAT)

CONVENT PENINSULA (HILLSIDE)

FORMER SEMINARY (VACANT)

STRUCTURE DEMOLISHED

CEMETERY

LAWN FOR CAR SHOW

COOKOUT AREA

MAIN BUILDING

EXIDE SMELTER

NORTH

SCALE IN FEET

ADVANCED GeoServices

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WEST CHESTER, PENNSYLVANIA 19380

EXIDE TECHNOLOGIES
OFF-SITE SOIL INVESTIGATION

CONVENT PROPERTY
EXPOSURE AREAS

Scale:	1" = 100'
Originated By:	P.G.S.
Drawn By:	M.J.P.
Checked By:	P.G.S.
Project Mgr.:	P.G.S.
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Figure:	2
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Appendix A

Convent Soil Data

Table A.1 Convent Soil Lead Data

Depth 0-3 inches

Exposure Area	Grid	Sample ID	Avg Pb (mg/kg)	Avg Pb for Exposure Area (mg/kg)
Inner loop	A	A-51-SEMINARY-01A	1,227	
Inner loop	AJ	AJ-51-SEMINARY-01A	3,316	
Inner loop	AK	AK-51-SEMINARY-01A	2,365	
Inner loop	AL	AL-51-SEMINARY-01A	645	
Inner loop	B	B-51-SEMINARY-01A	965	
Inner loop	C	C-51-SEMINARY-01A	1,558	
Inner loop	D	D-51-SEMINARY-01A	2,923	
Inner loop	E	E-51-SEMINARY-01A	1,658	
Inner loop	F	F-51-SEMINARY-01A	916	
Inner loop	G	G-51-SEMINARY-01A	3,523	
Inner loop	H	H-51-SEMINARY-01A	1,672	
Inner loop	HHHH	HHHH-51-SEMINARY-01A	1,290	
Inner loop	I	I-51-SEMINARY-01A	1,628	
Inner loop	IIII	IIII-51-SEMINARY-01A	2,110	
Inner loop	J	J-51-SEMINARY-01A	1,859	
Inner loop	JJJJ	JJJJ-51-SEMINARY-01A	1,664	
Inner loop	K	K-51-SEMINARY-01A	3,636	
Inner loop	KK	KK-51-SEMINARY-01A	2,759	
Inner loop	KKKK	KKKK-51-SEMINARY-01A	1,451	
Inner loop	LLLL	LLLL-51-SEMINARY-01A	106	
Inner loop	MMMM	MMMM-51-SEMINARY-01A	2,653	
Inner loop	Q	Q-51-SEMINARY-01A	2,790	
Inner loop	R	R-51-SEMINARY-01A	4,084	
Inner loop	W	W-51-SEMINARY-01A	3,436	
Inner loop	X	X-51-SEMINARY-01A	1,180	
Inner loop	Y	Y-51-SEMINARY-01A	2,974	**2,092**
North property	BB	BB-51-SEMINARY-01A	1,337	
North property	CC	CC-51-SEMINARY-01A	1,692	
North property	DD	DD-51-SEMINARY-01A	2,568	
North property	EE	EE-SEMINARY-01A	2,957	
North property	FFF	FFF-51-SEMINARY-01A	2,203	
North property	GG	GG-51-SEMINARY-01A	3,061	
North property	L	L-51-SEMINARY-01A	6,149	
North property	LL	LL-51-SEMINARY-01A	852	
North property	MM	MM-51-SEMINARY-01A	2,200	
North property	NN	NN-51-SEMINARY-01A	1,718	
North property	OO	OO-51-SEMINARY-01A	1,956	
North property	PP	PP-51-SEMINARY-01A	2,150	
North property	VV	VV-51-SEMINARY-01A	1,105	
North property	WW	WW-51-SEMINARY-01A	2,026	
North property	WWW	WWW-51-SEMINARY-01A	651	
North property	XX	XX-51-SEMINARY-01A	1,608	**2,140**

Exposure Area	Grid	Sample ID	Avg Pb (mg/kg)	Avg Pb for Exposure Area (mg/kg)
Field	HH	HH-51-SEMINARY-01A	3,492	
Field	II	II-51-SEMINARY-01A	6,177	
Field	JJ	JJ-51-SEMINARY-01A	15,483	
Field	M	M-51-SEMINARY-01A	3,506	
Field	N	N-51-SEMINARY-01A	9,769	
Field	O	O-51-SEMINARY-01A	17,888	
Field	S	S-51-SEMINARY-01A	5,698	
Field	SS	SS-51-SEMINARY-01A	3,964	
Field	T	T-51-SEMINARY-01A	9,188	
Field	TT	TT-51-SEMINARY-01A	4,951	
Field	U	U-51-SEMINARY-01A	20,472	
Field	Z	Z-51-SEMINARY-01A	3,476	**8,672**
Peninsula flat	AB	AB-51-SEMINARY-01A	1,729	
Peninsula flat	AC	AC-51-SEMINARY-01A	758	
Peninsula flat	AD	AD-51-SEMINARY-01A	913	
Peninsula flat	AE	AE-51-SEMINARY-01A	752	
Peninsula flat	AF	AF-51-SEMINARY-01A	614	
Peninsula flat	AG	AG-51-SEMINARY-01A	616	
Peninsula flat	AH	AH-51-SEMINARY-01A	548	
Peninsula flat	AI	AI-51-SEMINARY-01A	716	**831**
Peninsula hillside	ZA	ZA-51-Seminary-01A	13,336	
Peninsula hillside	ZB	ZB-51-Seminary-01A	9,985	
Peninsula hillside	ZC	ZC-51-Seminary-01A	6,036	
Peninsula hillside	ZD	ZD-51-Seminary-01A	5,337	
Peninsula hillside	ZE	ZE-51-Seminary-01A	9,251	
Peninsula hillside	ZF	ZF-51-Seminary-01A	3,229	**7,862**

Table A.2 Convent Soil Lead Data
Depth 0-10 inches

Exposure Area	Grid	Avg Lead (mg/kg)	Avg Lead (mg/kg)	Avg Lead (mg/kg)	Avg Lead for Exposure Area (mg/kg)
Depth		**0-3"**	**3-10"**	**0-10"**	**0-10"**
Inner loop	A	1,227	856	967	
Inner loop	AJ	3,316	1287	1895	
Inner loop	AK	2,365	2583	2517	
Inner loop	AL	645	564	588	
Inner loop	B	965	877	903	
Inner loop	C	1,558	1277	1361	
Inner loop	D	2,923	1588	1989	
Inner loop	E	1,658	752	1024	
Inner loop	F	916	1076	1028	
Inner loop	G	3,523	1598	2176	
Inner loop	H	1,672	1287	1402	
Inner loop	HHHH	1,290	535	762	
Inner loop	I	1,628	595	905	
Inner loop	IIII	2,110	1659	1794	
Inner loop	J	1,859	843	1148	
Inner loop	JJJJ	1,664	2141	1998	
Inner loop	K	3,636	1327	2020	
Inner loop	KK	2,759	1839	2115	
Inner loop	KKKK	1,451	925	1083	
Inner loop	LLLL	106	82	89	
Inner loop	MMMM	2,653	322	1021	
Inner loop	Q	2,790	1758	2068	
Inner loop	R	4,084	2060	2668	
Inner loop	W	3,436	1618	2164	
Inner loop	X	1,180	980	1040	
Inner loop	Y	2,974	1588	2004	1490
North property	BB	1,337	984	1090	
North property	CC	1,692	1829	1788	
North property	DD	2,568	1749	1995	
North property	EE	2,957	1438	1893	
North property	FFF	2,203	1699	1850	
North property	GG	3,061	2422	2614	
North property	L	6,149	1407	2830	
North property	LL	852	475	588	
North property	MM	2,200	984	1349	
North property	NN	1,718	1538	1592	
North property	OO	1,956	935	1242	
North property	PP	2,150	1598	1764	
North property	VV	1,105	659	793	
North property	WW	2,026	958	1278	
North property	WWW	651	1327	1124	
North property	XX	1,608	828	1062	1553
Field	HH	3,492	2673	2918	
Field	II	6,177	4297	4861	
Field	JJ	15,483	8132	10337	

Exposure Area	Grid	Avg Lead (mg/kg)	Avg Lead (mg/kg)	Avg Lead (mg/kg)	Avg Lead for Exposure Area (mg/kg)
Depth		**0-3"**	**3-10"**	**0-10"**	**0-10"**
Field	M	3,506	2652	2908	
Field	N	9,769	5242	6600	
Field	O	17,888	5252	9043	
Field	S	5,698	2502	3461	
Field	SS	3,964	1829	2470	
Field	T	9,188	4378	5821	
Field	TT	4,951	2973	3567	
Field	U	20,472	7843	11631	
Field	Z	3,476	1257	1923	5462
Peninsula flat	AB	1,729	1327	1447	
Peninsula flat	AC	758	777	771	
Peninsula flat	AD	913	1034	998	
Peninsula flat	AE	752	760	757	
Peninsula flat	AF	614	616	615	
Peninsula flat	AG	616	556	574	
Peninsula flat	AH	548	639	611	
Peninsula flat	AI	716	730	726	813

Note: Peninsula hillside has no samples from 3-10" depth.